

THE PERIODOSCOPE.

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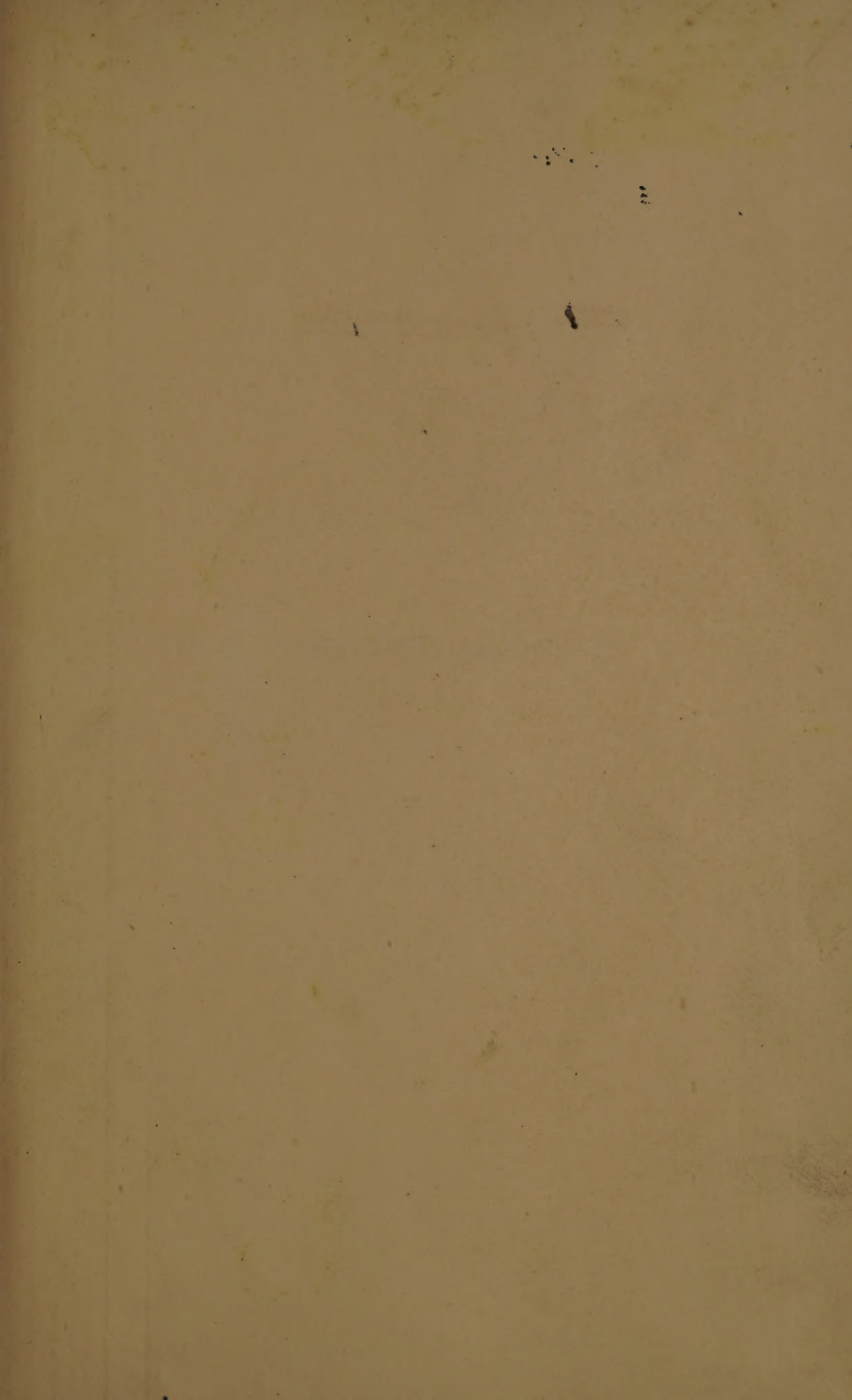
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THE PERIDOSCOPE.

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ON PARTURITION,

AND THE PRINCIPLES AND PRACTICE OF OBSTETRICS.

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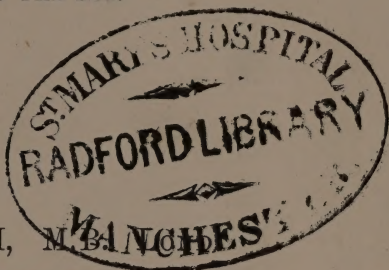
THE PERIODOSCOPE:

WITH ITS APPLICATION TO OBSTETRIC CALCULATIONS, AND
THE PERIODICITIES OF THE SEX.

BY

W. TYLER SMITH, M.D. IN CHARGE

OBSTETRIC LECTURER IN THE HUNTERIAN SCHOOL OF MEDICINE.



"Adque hanc normam matronæ prudentiores calculos suos subducentes spe raro excidunt; verum, transactis decem lunæ curricula, eodem die, quo (absque prægnatione foret) menstrua iis profluerent, partum experiuntur, ventrisque fructum colligunt."

HARVEY—*De Partu Exercitatio.*



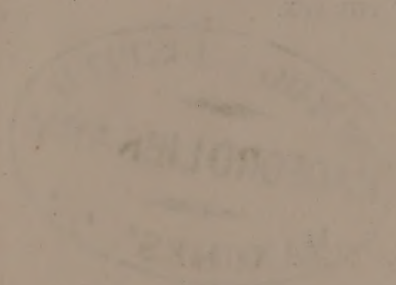
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THE LANCET

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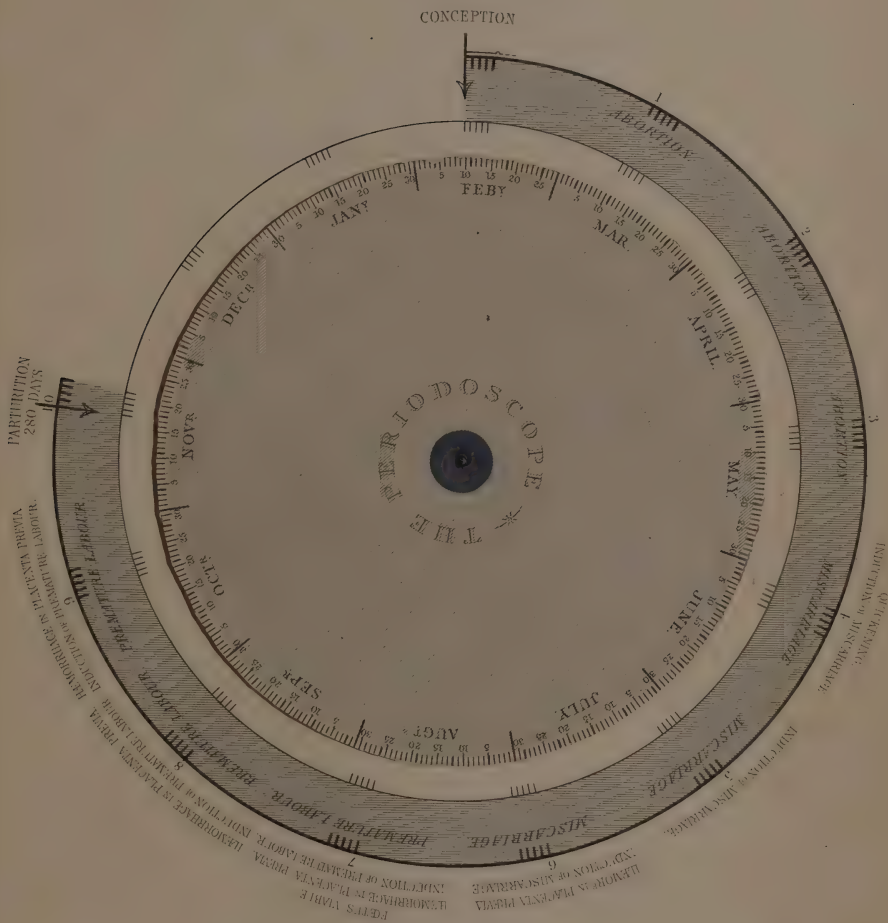
PREFACE.

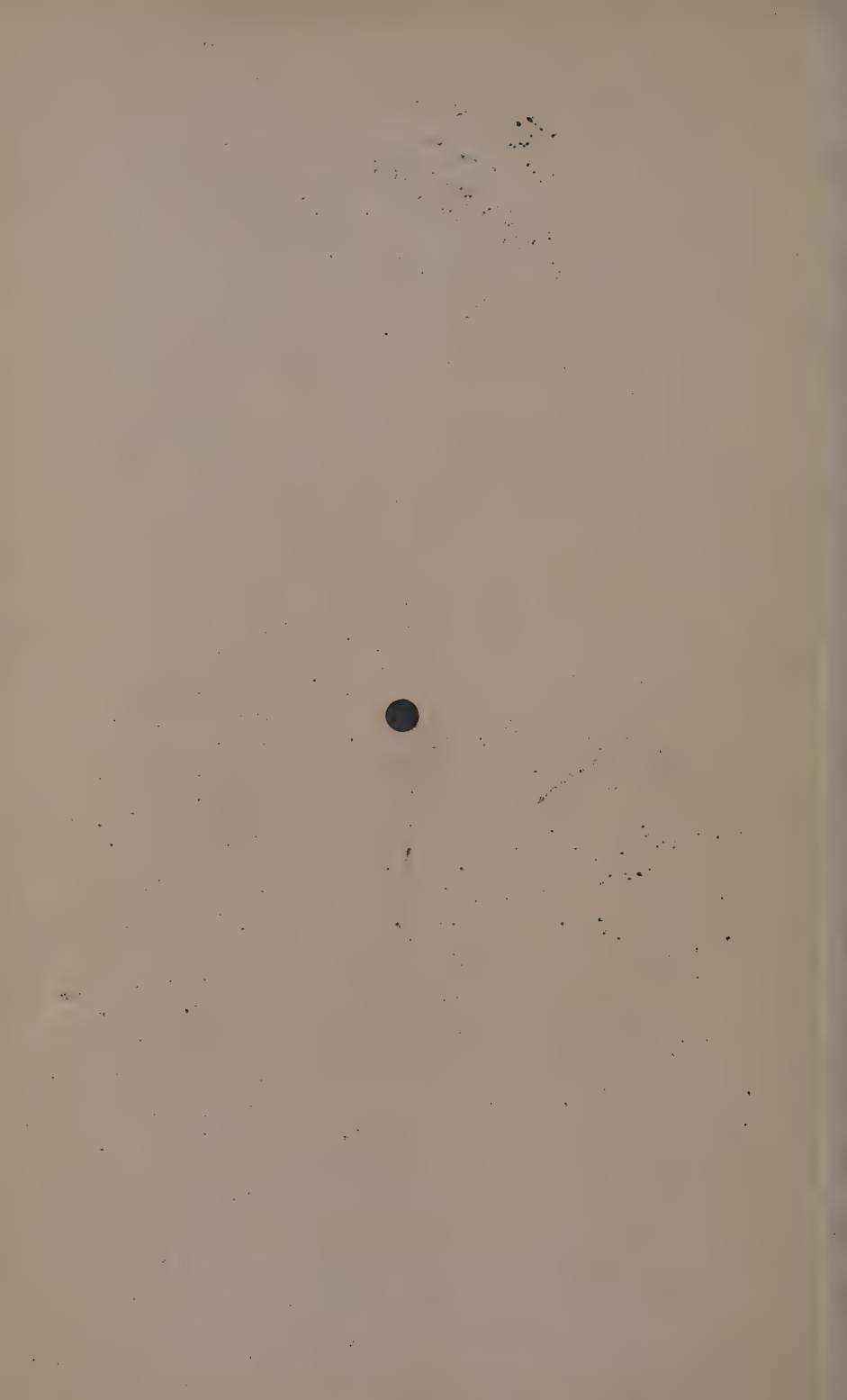
IT was my intention to publish the PERIODOSCOPE in a form adapted for use, on the completion of my Lectures on Parturition and Obstetrics, now in course of publication in the "LANCET." But from the numerous communications I have received respecting the woodcut which appeared in the Lecture on Abortion, I am induced to publish it at once, with a few pages of explanatory matter. Some correspondents have proposed minor alterations; others, that it shall be made of different materials, as metal or ivory; some, I find, do not understand my meaning of the manner in which it can be applied to obstetric calculations; all, however, recognise the utility of a table for converting calendar into lunar or periodic months.

Great care has been taken to render the instrument exact, and in the Essay which follows, a short notice is given of each word or term found in the engraving. As my object is its general diffusion, I am happy to say, that

in consequence of an application which has been made to me, the PERIODOSCOPE will be used in the "Register of Midwifery Cases," about to be published by the government stationer, under the sanction of the Registrar-General.

7, Bolton Street, Piccadilly, 1848.







SECTION I.

I. INTRODUCTORY NOTE.

THE Obstetric Calendar or Table which forms the principal feature of the present Essay, I have termed the PERIODOSCOPE. To render my meaning respecting its uses clear and intelligible, it will be necessary to give a slight sketch of the whole subject of Periodicity in the sex.

In the healthy unmarried woman, the catamenial periodicity goes on in one unvarying round from puberty to the climacteric; but when impregnation takes place, a deviation occurs, and the female periodicity is modified in a remarkable manner, until the return of the system to the catamenial periods, after pregnancy, parturition, and lactation have passed. I propose more particularly to trace this periodicity from its point of departure at conception, to its return to the usual course. In this circuit, parturition is the most important event; childbirth is the culminating point in the whole physical life of woman, towards which all tends, after which, all declines.

To ascertain the normal term of gestation, the date

at which Parturition may be expected in any given case, is one of the most interesting and important points in the study of periodicity.

II. DURATION OF GESTATION.

The actual duration of human pregnancy is computed to be ten lunar months, forty weeks, or two hundred and eighty days. Upon this subject there is little difference of opinion among obstetricians. Indeed, it is almost extraordinary that any such agreement should exist, when we take into consideration the different data upon which different authorities found their calculations. Some accoucheurs date from the *commencement* of the last true catamenial period; others reckon from the day of its *termination*; some, again, reckon from a date three or four days *subsequent* to the completion of the period; and there are others who date from the *middle* time between the last-observed period and what would have been the date of the next catamenia, had not pregnancy supervened. Among women themselves, equal diversities exist. Some have traditional ideas of the date of parturition peculiar to their own families, or observed in themselves; and generally, a considerable latitude, ranging about, before, or after, the last catamenial date, is allowed by them. Others depend solely upon quickening as the time from which to calculate, neglecting the catamenial periods altogether.

The modes of reckoning the forty weeks have been as loose and unsatisfactory as those of fixing the date at

which to commence the calculation. Nine calendar months is considered by many accoucheurs sufficiently accurate to set aside all further trouble. Others, more careful, add a certain number of days to the day of the month on which the catamenia last appeared, say five, six, or seven days, and then appoint that date nine calendar months afterwards for the occurrence of parturition. Dr. Chowne, who possesses some valuable statistics relating to the duration of pregnancy, has informed me of an ingenious plan which he adopts, of adding a few days, and instead of reckoning nine months in advance, reckoning three months backwards, and then assigning the date of labour a twelvemonth from that time.

But the mode of reckoning by calendar months must constantly vary a few days, according to the precise calendar months which make up each individual pregnancy. Thus, a pregnancy beginning in February would include nine calendar months, making 273 days; while the nine calendar months of a pregnancy beginning in May would contain 276 days. Accoucheurs are constantly expected by patients to foretel pretty nearly the date of their confinements. Those who wish to be quite exact, make a methodical calculation, adding together the days of the calendar months in prospective, until they have obtained 280 days. But owing to the awkwardness of adding together irregular calendar months, and the fragments of the months at the commencement and termination of gestation, this calculation is a tedious process, and in the hurry of consultation is often made incorrectly.

III. MECHANISM OF THE PERIODOSCOPE.

The small, moveable disc of the Periodoscope contains the fifty-two weeks of the year, and it is also divided into thirteen Lunar months, or Ovarian periods. The circle beyond this contains a fixed scale of the catamenial periods; and the outer segment of a larger circle contains a scale of 280 days, the normal duration of pregnancy, divided into the ten catamenial cycles of gestation. I mark five days upon the calendar as being the ordinary duration of the catamenia, but, as I shall have to repeat, in some women it is greater, in others less, than this. Reckoning the catamenial period preceding conception, and the lochial period of parturition inclusive, I have figured on the instrument eleven catamenial dates; so that the outer scale really represents 285 days. The best mode of computing the time of parturition I believe to be this: we should find the date of the commencement of the last catamenia, upon which conception would in ordinary cases ensue a few days after the cessation of the catamenial flow, and we may then expect that the ovarian irritation, or the lochial flow, which determines the occurrence of natural parturition, will commence with the sanguineo-mucous secretion, or with the uniform contraction of the uterus, at the commencement of the eleventh catamenial date; and that labour will become fully developed on some one of the days of this ovarian period, or of the days in which the ovule would have descended the Fallopian tubes, supposing there had been no conception, and the catamenial dis-

charge and ovulation had proceeded regularly. Thus the scale of calendar months being moveable, and the scale of lunar months or ovarian periods being fixed, all that need be done is to turn the moveable circle round, so as to make the arrow at the word "CONCEPTION" point to the date at which the last catamenia commenced, when the second arrow at the other end of the scale will point to the exact date when the commencement of "PARTURITION" may be expected. The lunar or ovarian scale of pregnancy will also mark accurately the date of each of the periodic excitements which occur, with more or less distinctness, during pregnancy; so that we may at once, without the trouble of a moment's calculation, read off for the use of patients the probable time of parturition, and the dates when all physical irritation and causes of abortion are to be specially avoided. Of course these remarks apply to strictly natural cases of utero-gestation occurring in women whose catamenia appear every 28 days. The only possible source of error, with an exact instrument, is, that 52 weeks only make 364 days instead of 365, and that leap year always contains 366 days; but this is allowed for with the greatest ease, if it should happen that the pregnancy includes December and January, or February in leap year. Otherwise there is no mistake in the calculation of a single day. Any variation in the length of pregnancy from this standard is either before or after the proper time.

Although the present year (1848) is leap-year, I have allowed only twenty-eight days for February, since it will be much easier to add one day for February every

fourth year, than to subtract one day from this month in the three intervening years. In December, there are only thirty days represented on the scale of calendar months, instead of thirty-one: this was necessary in order to make the calendar scale correspond exactly with the scales of the catamenia and of gestation. The irregularity of this one day beyond fifty-two weeks, if included, would have vitiated the whole instrument. It will be necessary, therefore, in all calculations with the Periodoscope, to allow one extra day for February every leap-year; and in all years in which gestation includes the end of December and the beginning of January, to allow one day in the lunar scale, in order to complete the 365 days of the solar year. That is to say, whenever the whole of December is included in a given calculation, the probable time of expected parturition will be one day later than the day of the month indicated on the Periodoscope; in leap-year, whenever February is included, it will also be one day later; and when February and December are both included in a pregnancy occurring in leap-year, the date of expected delivery will be two days later, just as in the ordinary loss of one day in each year, and of two days in each leap-year, when reckoning by the common almanack.

This simple contrivance gives us, at a glance, other information of a practical kind besides the duration of gestation, which it would take much time to calculate accurately in individual pregnancies in any other way. Thus it indicates the probable dates of the occurrence—

1. Of Abortion, Miscarriage, and Premature Labour.
2. Of Quickening, or the first Uterine movements.
3. Of the Viability of the Fœtus.
4. Of the periods when Premature Expulsion may be induced artificially, most easily and most safely.
5. Of the periods of special danger from hæmorrhage in Placenta Prævia.
6. OF THE COMING ON OF LABOUR; It is also a complete Calendar—
7. Of the Catamenia.

But I proceed to speak of these several points more in detail. The Periodoscope was suggested by the want I felt of such an instrument in actual practice, particularly in the prevention of Abortion, and by my researches into the Cause of Labour. In regard to points of skill, patients can seldom judge correctly; but in all that relates to dates in pregnancy, they expect the obstetrician to be prophetic. This he can never be, with a complicated sum in addition and subtraction to work out in a hurry in each case, as in the old methods of computation.

The following Table gives a distinct view of the principal events of pregnancy, and of the events preceding and following gestation, respecting which the Periodoscope promises to be useful and convenient. It will be observed that I have divided the nine periodic dates of pregnancy, exclusive of the catamenial date preceding conception, and the date of parturition itself, into three Trimenial epochs, each of which contains three catamenial dates.

IV. TABLE OF THE CHIEF EPOCHS OF PREGNANCY, &c. &c.

1. Catamenia preceding Conception.
 2. Conception.
-

1st
Trimenial
Epoch. { 1. Danger of,
Abortion.

4th Catamenial Period.—That of Quickening.

2nd
Trimenial
Epoch. { 1. Miscarriage.
2. Induction of miscarriage.
3. Hæmorrhage in placenta prævia.

7th Catamenial Period.—That of Viability of the Fœtus.

3rd
Trimenial
Epoch. { 1. Premature labour.
2. Induction of premature labour.
3. Hæmorrhage in placenta prævia.

10th Catamenial Period.—That of Parturition.

1. Lochia.
2. Mammary periodicities.
3. Reappearance of the catamenia.

SECTION II.

I. THE CATAMENIA.

THE flow of the catamenia usually takes place every twenty-eight days, reckoning from the first day of one appearance to the first day of the next, and continues at each period for a time varying from three to seven days. In the Periodoscope, I have represented five days as the medium duration of each catamenial flow. The natural periods of women are the same as the lunar revolutions in *frequency*, but they do not accord in *time* with the lunar phases, so that this coincidence is purely accidental. Different women have the catamenia present at different times of the month; but twenty-eight days, or a lunar period, as far as duration is concerned, is the natural term of the catamenial cycle, and this fact forms the basis of all the periodicities of the sex.

Although twenty-eight days are the normal term, the catamenia return in some women every fortnight, in others every three weeks, in others only every six weeks, with great regularity. These exceptions do not, however, invalidate the calculations we can make in ordinary cases.

Some subjects in whom the catamenia are regular, have a leucorrhœal flow exactly in the middle of the intervals. Others have a distinct intimation of a hemi-

catamenial nismus, with headach, hysteria, or neuralgia. I may mention, that Dr. Strange, of Bridgenorth, has recently observed an interesting case of this kind.

In practice, the observance of the periodic dates of the catamenia is often of essential service. The middle circle of the Periodoscope is therefore devoted to the Catamenial Function, as it occurs in the unmarried female or in the married while she is not bearing children.

By such a mode of reckoning as that of the Periodoscope, the prospective periods can be determined without trouble, and the progress of amendment in cases of partial amenorrhœa, dysmenorrhœa, and irregular menstruation, is seen at a glance as the periods come round. At present, the information of patients is often vague and unsatisfactory on these points. Some women keep a reckoning of their periods, others depend chiefly on memory, but their accounts of themselves as to the commencement of amenorrhœa, the commencement of pregnancy, &c., are often doubtful. Not long since, I attended a lady in whose case it was impossible to get an account of the catamenial periods, but in which such an account would have been highly important. It was a case of mania, connected with a disappointment in marriage and the suspension of the ovarian function, in which it was anxiously desired to know the proper time for the appearance of the catamenial flow, so that its slightest tendency might have been encouraged. As often happens in these cases, the appearance of the catamenia, and the return to reason, were at length simultaneous. The catamenial periodicity is so deeply impressed upon the female constitution, that it often involves within it some

of the most important diseases of women ; as, for instance, mania, puerperal convulsions, epilepsy, neuralgia, cephalalgia, &c., all of which have a strong tendency to recurrence or exacerbation at the catamenial periods. If it were the custom of women to keep an exact account of the ovarian periods, such a record would often be of great value to the physician. In ordinary cases, I mean cases where the period returns every twenty-eight days, all that is not catamenial is malady, in fact, pathological. How often in delicate females are the seeds of incurable disease sown by improper exposure on the days when the catamenia are due ! If any woman, with the catamenia perfectly regular, were once to adjust that portion of the Periodoscope which relates to the catamenia, by her own periods, and were then to render the moveable portion of the instrument fixed, she would be able at once to see the slightest irregularity which might occur in the ovarian function. If she continued in perfect health, the adjustment of the catamenial circle must continue to correspond with her own function, unless pregnancy intervened. Even then no difficulty would occur, she would merely have to transfer her attention from the catamenial circle to the scale of pregnancy. If nursing were prohibited from any cause, she would have, after delivery, to observe the catamenial circle again ; and if lactation followed pregnancy, the catamenia, following the latent periodicities of lactation, would probably fall upon a regular period, as indicated in the Periodoscope when this process was completed. Thus the instrument once adjusted, becomes in a degree prophetic of the whole reproductive era ; no confusion

could occur, so long as the individual remained in perfect health. It would still point correctly to the condition of the sexual functions, whether ovulation, gestation, or lactation were proceeding. The slightest aberration must infallibly be an indication either of irregularity or failing health.

Doubtless there are some highly favoured persons who would never experience any interruption or variation of the natural periodicities; in such cases, the instrument would need no readjustment, except at the commencement of pregnancy, during all the era of the catamenia and childbearing. Only, as I have said, every year a single day, the 365th, would have to be allowed for, and an additional day every fourth year, on account of leap-year.

II. CONCEPTION.

There is a periodicity in the aptitude for conception in the human female, as well as in the other sexual functions, and a distinct periodicity of the sexual emotions attends the aptitude for impregnation.

Women are more prone to conceive in the first few days after the termination of the catamenial period than at any other time. It appears from observation and experiment, that when the ovule is mature, it may be impregnated by the spermatozoids, either in the ovisac, or in the extremities of the Fallopian tubes. During the catamenial flow, the ovaria are making preparations for the discharge of the ovule through the Fallopian tubes, and this discharge

is in general not completed until after the catamenial period has passed. After the cessation of each catamenial flow, the aptitude for conception diminishes every day, until it is at its minimum in the mid-date between the cessation of the discharge of one period, and the commencement of the discharge of the next. It is, however, quite possible for conception to take place a day or two before the date of the catamenial period, while the ovule is still in the ovarium. In some of these cases, the catamenial flow is prevented altogether, in others it occurs naturally, or it may be even more profuse than usual.

In rare cases, ovules are prepared for impregnation in the intervals between the catamenial epochs, but I am here speaking of the general rule, which is, that one or more ovules are matured in the ovarium every twenty-eight days.

The times of aptitude and inaptitude for conception are important; for instance, in the treatment of sterility; or in the case of married persons who, with deformity of the pelvis, from rachitis in childhood, or molities ossium occurring after marriage, can only become pregnant with the certainty of involving the life of the mother or the child, or both, in destruction; or again, these periodic times deserve consideration in cases in which lactation and menstruation go on together, and where pregnancy following soon after delivery would seriously injure the mother, the child at the breast, and the foetus in utero.

III. ABORTION.

This term is limited by some writers to the expulsion of the ovum before the fourth catamenial date of pregnancy; others extend it to all cases of premature expulsion before the tenth or natural term of gestation; I now use it in the more limited signification. Abortions occurring between conception and the fourth period, more frequently happen at the periodic dates, than in the intervals, a fact of importance in a practical point of view, as prompting the observance of extra care and precaution at these dates. Giving the above limit to the signification of the word abortion, this accident is rarely dangerous, because of the small size of the uterus, and the consequent limitation of the attendant hæmorrhage. Again, in these early expulsions of the fœtus, the uterus contracts but imperfectly, and the hæmorrhage must be restrained by mechanical pressure, coagulation, astringents, &c. When the abortion takes place at the periodic dates, the lochia follow just as in natural parturition, and conception may take place after it, just as after an ordinary catamenial period. In the above remarks, it is not of course meant to be said that abortion does not occur at the intervening times; but it is undoubtedly true, that in the majority of cases, the accident happens at the dates of the periods. This is more particularly true in dysmenorrhœal cases, in which after conception the catamenial nîsus returns with considerable pain and inconvenience every twenty-eight days. In some of these cases there is even a san-

guineous discharge from the vagina at every periodic date throughout pregnancy.

In cases of threatened abortion, every kind of irritation of the sexual system should be avoided at the catamenial dates, and the organs in reflex relation with the uterus, such as the rectum, bladder, and mammæ, should be kept as free as possible from irritation; muscular exercise should be limited at these times, and mental emotion should be avoided. In all cases, whether there be apprehension of abortion or not, women should observe the catamenial dates of pregnancy, and treat themselves as carefully as they would during the true catamenial periods in the unimpregnated state. This care should be resorted to for at least the same number of days.

It will be observed, that there are in the first trimenial epoch three special periods of risk of abortion, strong in proportion to the predisposition of the patient; these three periods correspond to the catamenial dates at the end of the fourth, eighth, and sixteenth weeks of pregnancy.

The Periodoscope, when set accurately by the date of the last catamenial period before conception, gives in a moment the dates of the three next catamenial periods. This requires a formal calculation by the ordinary method, and one not likely to fix the attention of either patient or practitioner when made. The three periods at which there is the greatest chance of Miscarriage, and also the three periods at which Premature Labour may occur, present themselves at the same time. In effect, this mechanism projects the catamenial calendar for a space

of nine periods, onward through the ordinary calendar. If it did nothing more than this, it must doubtless prove useful in practice by pointing out and enforcing the times during which precaution is especially necessary in pregnancy.

There are many disorders of the unimpregnated state to which women are liable, and in which it is advisable to suspend medical treatment during the flow of the catamenia. In the same way, during pregnancy, the treatment of disease should be modified by the catamenial dates; both patients and practitioners should observe these periods as scrupulously as though the actual flow of the catamenia were present. While it is necessary, in some cases, to suspend medical treatment, in others, on the contrary, these dates are attended by so much pain and irritation, that they require treatment as urgently as in severe dysmenorrhœa. In some of the most painful and lingering labours which occur, the intense agony is mainly owing to a dysmenorrhœal tendency, neglected during pregnancy, but appearing with accumulated severity at the time of parturition.

Although the periodic dates are deserving of care throughout the whole of pregnancy, the three most important periods are those I am now considering. Up to the time of quickening, the periodic *molimen* is more distinctly felt than subsequently, and as the attachment of the ovum to the uterus is not now so consolidated as it afterwards becomes, these three periods are especially prolific in abortions.



SECTION III.

I. QUICKENING.

THIS event takes place usually between the third and fifth lunar months, but I believe the most frequent time at which the sensations of quickening are observed, is the end of the fourth catamenial period, or sixteen weeks from the time of conception. Quickening is attended by different sensations in different persons; some distinctly feel the abdominal movements for the first time; some have a slight flow per vaginam at this date; others feel cold, nervous, or faint, or even suffer an attack of hysteric convulsive affection, while not a few fail to distinguish any special signs. All attribute great importance to quickening, and some base their calculations respecting the duration of pregnancy entirely upon it. Among accoucheurs, various causes are assigned for the symptoms of quickening. It is generally attributed either to the first movements of the fœtus, as they are called (the ancient hypothesis upon which the word *quicken*ing depends), or to the ascent of the gravid uterus into the abdomen from the pelvis. I have advanced elsewhere my reasons for believing the abdominal movements commonly attributed to the fœtus, to be in reality peristaltic actions of the uterus itself. I believe that quickening really means the time when

the uterus itself first begins to move physiologically—to take its place as a distinctly muscular and motor organ. It is a quickening of the uterus, rather than of the fœtus. These movements continue from this time with more or less vigour, to the date of parturition. The sanguineous flow, sometimes seen at the time of quickening, I strongly suspect to be catamenial in its nature, happening, as it usually does, at the date of the fourth catamenial period of gestation. The ascent of the uterus into the abdominal cavity is quite inadequate to explain the sensations of quickening; and movements of the fœtus at this time, sufficient to account for them, are plainly impossible.

II. MISCARRIAGE.

This term is applied by those who limit abortions to the first sixteen weeks, to the premature expulsion of the ovum, occurring between the end of the fourth, and the end of the seventh, periods of pregnancy. This is the second trimenial epoch. In miscarriage, the uterus contracts in tolerably regular pains, as in parturition, and in the hæmorrhages which now occur, the mode of arresting the flow of blood is by inducing uterine contraction. Premature expulsion of the fœtus is now much more dangerous to the mother than it was before the time of quickening; hæmorrhages of all kinds are more serious. Just as in the case of abortion, the times of special risk of the accident are the first three periodic dates; so the fourth, fifth, and sixth periodic dates of pregnancy are those in which miscarriage chiefly

occurs. This at once suggests the removal of all sources of uterine excitement, and the avoidance of excitement of the organs in reflex relation with the uterus, at these times. The great anxiety in such cases is to carry the patient safely over the time when the foetus becomes viable. Until this point has been reached, the proper treatment in cases of threatened abortion is often embarrassed by apprehensions for the life of the ovum.

III. ARTIFICIAL MISCARRIAGE.

There are various contingencies of pregnancy, in which it may become necessary, and even an imperative duty, to induce premature expulsion by artificial means. Such are, dangerous hæmorrhages, from placenta prævia or other causes; excessive vomiting, so long continued as to threaten the life of the mother; convulsions occurring during gestation and refusing to yield to treatment; the existence of such an amount of constitutional irritation from pregnancy as to threaten the life of the mother; the presence of such a degree of pelvic distortion as to render it perfectly hopeless that the child can be born viable; the existence of uterine or ovarian tumours; and other conditions which sometimes co-exist with pregnancy. The mode of performing the operation is either to insert a tent into the os uteri; to perforate the membranes with a probe or stiletted catheter passed through the os uteri; or to separate the membranes from the uterus at the cervix. Other modes—such as the injection of cold water, or irritant solutions; the internal use of the ergot of rye, or pressure upon the os uteri by

the tampon—have been recommended, but these are all less certain in their result. With respect to the time at which the operation can be performed, it is useful to know that it is far easier to effect, and that it produces less constitutional disturbance to the mother, at the periodic dates than at other times. At these dates, there is a natural tendency of the uterus to act expulsorily, and when the operation has to be performed after the date of the viability of the fœtus, the premature expulsion is rendered more like natural labour, and consequently safer to the fœtus. The catamenial dates, therefore, should always be chosen for the operation, except in those urgent cases where the necessity for its performance is so immediate as to admit of no delay.

IV. HÆMORRHAGE IN PLACENTA PRÆVIA.

In these dangerous cases, the hæmorrhage generally commences at one of the periodic dates. Before the commencement of the second trimenial epoch, these hæmorrhages are scarcely to be distinguished from the hæmorrhage of ordinary abortion. In the second trimenial division, they are more perilous than simple miscarriages, but far less dangerous than unavoidable hæmorrhages in the third trimenial space. It is in the latter months of pregnancy that danger chiefly occurs, owing to the greater development of the cervix uteri at this time. When hæmorrhage from implantation of the placenta over the os uteri has once occurred, it is liable to return at intervals, until the uterus has been finally emptied of its contents. It may occur at any time, but it is more

likely to recur, and more likely to prove dangerous at the periodic dates than at other times, because of the vascular and nervous excitement which accompanies them. They should therefore be carefully watched in all cases of pregnancy in which hæmorrhage has once happened, or in which there is reason to suspect placenta prævia. The danger from placenta prævia begins with the changes in the cervix uteri, and increases as pregnancy advances, becoming more and more perilous at each catamenial date, the nearer the hæmorrhage is to the time of natural parturition.

SECTION IV.

I. VIABILITY OF THE FŒTUS.

THE fœtus becomes viable, that is to say, capable of sustaining itself at the breast, after the end of the seventh period of pregnancy. This is at the expiration of 28 weeks, or 196 days from the date of conception. Viability differs from the fact of being merely alive; many fœtuses are born living, who are not viable: an important distinction. This is the earliest time at which viability can be reasonably calculated upon, and very many children born at or even after this time perish from immaturity. Still it is at this point that extra-uterine viability begins. It marks, therefore, one of the principal events of pregnancy, dividing Miscarriages from Premature Deliveries, just as the fourth period, or the time of Quickening, divides Abortions from Miscarriages. It is important in practice, because in cases of placenta prævia, and in cases requiring the induction of premature labour, the great object is to carry our patients safely over this period, so that the child may, if possible, be born alive, and not only living, but viable. In pelvic distortion, for instance, fœticide is avoided if the operation for inducing premature expulsion can, with safety to the mother, be deferred until after this period, and yet delivery be

effected without lessening or injuring the child. There are many Ethical points in obstetric practice which do not exist in the other departments of medicine, but there are none of greater importance than this, of destroying the foetus to defend the mother from an immediate or prospective danger. It throws a heavy responsibility on obstetricians, for there is no authoritative Medical canon upon the subject, and the Law takes no cognizance of it whatever: it knows of no justifiable Fœticide.

II. PREMATURE LABOUR.

The chief danger of this form of premature expulsion occurs, like abortion and miscarriage, at the periodic dates. At the seventh, eighth, and ninth periods, there is the tendency to excitement in the utero-spinal system. It is not, however, so frequent in this trimenial space, as in the first or second, probably because in women with a strong tendency to premature uterine action, the ovum is generally expelled in the early months. Everything now resembles more and more closely the act of natural parturition. The same stages, and succession of processes, are observable. In the early months, abortion is distinctly a spasmodic disease, as much as asthma, or strangury; but the action of the uterus has now become almost purely physiological. It resembles natural labour in its dangers and accidents, as well as in its physiology. In speaking of the periodic dates as the times when accidents most frequently occur, of course I do not mean that the intervening times should not receive every care. This care is even more important in advanced

pregnancy, than it was during the early and middle months.

I mentioned, when speaking of abortion, that uterine excitement should be avoided at the periodic dates. The danger from physical irritation is greater during the first three, and the last three, lunar months of pregnancy, than in the interim. In the first three lunar months, the uterus has not ascended into the abdomen, and its weight and volume depress it in the pelvis; in the three lunar months before parturition, the uterus occupies both abdomen and pelvis, and the os uteri is frequently very low down in the vagina.

If we review the whole duration of pregnancy, we see at a glance, that, omitting the catamenial period preceding conception, and the period which ushers in parturition, it includes nine catamenial dates. Each of these periodic dates has its own peculiar features. They, however, naturally admit of the division into three Trimenial epochs, of three periods each. The first of these is divided from the second by the occurrence of Quickening; the second is divided from the third by the Fœtus becoming Viable. At the first three periodic dates there is, as I have said, the special danger of Abortion; in the second trimenial epoch, there is the danger of Miscarriage; and in the three periods in the third trimenial epoch of pregnancy, the danger of Premature Labour comes into operation.

III. INDUCTION OF PREMATURE LABOUR.

This term applies to all cases of artificial delivery during the third Trimeniad. The operation is easier of performance at this time, while it is not more dangerous to the mother, either in itself or in its results, and it does not destroy the child; on the contrary, it may often be a benign means of its preservation, when its death would be otherwise inevitable, as in cases of great pelvic distortion.

Artificial delivery is now a far more justifiable operation than it was when the fœtus had not yet become viable. Before that time, it was an operation sometimes imperatively necessary, but always involving much responsibility, and never justifiable except with imminent or future prospect of great and irremediable risk to the life of mother or the child, should the fœtus be allowed to remain in utero. It is only when Nature would destroy *two* lives, that Art can dare to destroy *one*, and that one already doomed to destruction, in order to give the chance of safety to the other. When resolved upon, the operation should be performed, if possible, at one of the catamenial dates.

IV. HÆMORRHAGE IN PLACENTA PRÆVIA.

There is now the same liability to hæmorrhage from malposition of the placenta, as in the second trimenial epoch, and the danger, when it does occur, is much increased. The os and cervix uteri are now so developed, the placenta is of such size, and the utero-placental circulation so

considerable, that when extensive separations of the placenta from the uterus occur, the most imminent peril is incurred. These separations are more likely to happen at the seventh, eighth, and ninth catamenial dates, than in the intervals between them. In cases of hæmorrhage from placenta prævia, it is also more difficult to arrest the flow of blood when the uterus is under the excitement of the ovarian periods than at other times. These precautionary dates are accurately marked upon the Periodoscope.

SECTION V.

I. PARTURITION.

I HAVE insisted, in my Lectures, on the importance of the ovarian or catamenial periodicity in calculating the duration of pregnancy, and in elucidating the Cause of the coming-on of Labour. Others had remarked on the fact, that the duration of natural pregnancy is a multiple of the catamenial period, and they have supposed parturition to be brought on at a particular time in consequence of some mysterious determination to the uterus, connected with the catamenial crisis. But this existed only as a vague hypothesis, without any definite scientific meaning. Until I did so, I believe no one had ever pointed out, that it is the ovaria and the ovarian nerves which excite the uterus in the REFLEX manner at the conclusion of the tenth ovarian period of pregnancy. The duration of pregnancy is not merely a multiple of the ovarian period in point of time, but it is actually composed of ten ovarian periods. Ten lunar periods make the term of pregnancy, but the ten ovarian periods actually begin and end within the parturient cycle. It is an interesting inquiry, whether in subjects in whom the ovarian periodicity is less or more than twenty-eight days, the duration of pregnancy still remains 280 days? In all the irregularities of the ovarian or catamenial periods which

I have observed, the period has been some multiple of seven days. In rare cases the catamenia return every fortnight, in others every three weeks, and in some only every six weeks. We should expect that pregnancy, instead of being a multiple of the ordinary period of twenty-eight days, would prove to be some multiple of the peculiar period, in these cases. This would make the duration of pregnancy vary somewhat according to the variation of the catamenial period.

In ordinary pregnancy the standard is—

$$10 \times 28 = 280 \text{ days.}$$

In the variations already referred to, the duration would probably be—

$$20 \times 14 = 280 \text{ days.}$$

$$13 \times 21 = 273 \text{ days.}$$

$$7 \times 42 = 294 \text{ days.}$$

Thus, in women who have the catamenial flow every three weeks, parturition would probably be one week earlier than usual; in those rarer instances in which the catamenia return every six weeks, it should be either a fortnight later, or a month earlier, than the natural time.

Many practitioners who do not recognise the ovarian periodicities of pregnancy, still admit the natural term of pregnancy to be 280 days. The Periodoscope would be useful to them as an indicator of the time of parturition, from whatever date they might choose to begin to calculate the term of 280 days. It would, however, viewed in this light, be simply a table for reducing calendar to lunar months, quite irrespective of any of the important events or periodicities of pregnancy.

If any practitioner should believe the duration of pregnancy to be less or more than 280 days, he would still be able to use the calendar, and thus test his own opinions and those of others more accurately and conveniently than by any other method.

The ultimate time to which parturition may extend after conception is a very important question, and one as yet by no means settled satisfactorily. It is curious that in decided cases of over-term pregnancy, the date of parturition has often been exactly or very nearly a lunar month later than it should have been. Now that we can understand the true cause of labour, it will excite no surprise that in some exceptional cases the ovarian excitement of the tenth period of pregnancy may not be sufficient to induce uterine action and expulsion, and that the parturient actions should slumber till the next ovarian period; thus, $11 \times 28 = 308$ days, which would be the term of gestation in such cases. In the most celebrated case of modern times, that involving the Gardner peerage, Lord Eldon, with the characteristic caution of that great lawyer, left the *ultimum tempus pariendi* untouched; he declined to decide on the physiological question, and the candidate to the peerage was barred because of the proved adultery of Lady Gardner. If this case had then been decided physiologically, the decision would probably have been against the possibility of pregnancy lasting either 304 or 311 days, the terms which were in question. However, were such a case to arise in the present day, uncomplicated by other suspicions, I think the decision could not fail to be different, at all events as far as 11 periods or 308 days.

are concerned. I believe there may be rare cases in which parturition is really deferred one entire catamenial period of twenty-eight days beyond the natural term. There are others which appear to be over-term, but which in reality are not so. These cases occur when women conceive just before a catamenial period. Where this happens, the catamenial flow will sometimes occur just as though conception had not taken place. In other cases, no signs of the catamenia appear after a conception occurring at this phase of the catamenial function. Here it is evident that, reckoning from the last appearance of the catamenia, one whole period would be included in the calculation of pregnancy, which had really passed before the occurrence of conception.

In speaking of 280 days as the natural term of gestation, there is another qualification to be considered. It is the catamenial period rather than the act of impregnation which determines the time of the coming on of labour, and as conception does not usually occur until after the disappearance of the catamenial flow, there are not quite 280 days from the date of conception to the date of parturition. At the commencement of a catamenial period, the appearance of the uterine secretion is an indication that the ovarium is in a state of excitement, and that it contains a mature ovule, which it is preparing to discharge by the oviducal apparatus, the Fallopian tube. This separation and discharge of the ovule, which commences and proceeds during the catamenial flow, though it is completed subsequently, may be called ovarian birth, as contrasted with uterine birth at the time of delivery. If impregnation arrests the ovule, the

changes of conception and intra-uterine development proceed, but the date of parturition is influenced not so much by the day and hour of conception, as by the day and hour upon which the ovule commenced its departure from the ovarium. Whether conception occur just before the date of the catamenial discharge, or during its flow, as sometimes happens, or a short time subsequently, the proper date of parturition will not vary; it will still be ruled by the periodicity based on the first day of the appearance of the catamenia. When we say, therefore, that the natural term of gestation is 280 days, it is meant that 280 days elapse between the commencement of the discharge of the *ovule* from the ovarium, and the commencement of the expulsion of the developed *ovum* from the uterus. It is with this meaning, I have included the catamenial days preceding actual conception in ordinary cases, in the scale of utero-gestation upon the Periodoscope. I have placed a bracket over the catamenial and subsequent days, one arm of the bracket, as will be seen, being undefined, because we do not know the exact number of days after the cessation of the discharge during which conception would be possible.

It is well known that in some females, who are perfectly regular, the catamenia will appear with remarkable precision at a certain hour. In this, the ovarian is different from the lunar month, each new moon being at a different hour of the twenty-four. In rare cases parturition also will be exact to the very hour at which the proper catamenial period is due.

II. THE LOCHIA.

I have been accustomed to point out the identity between the lochial discharges of animals and the phenomena of œstruation, and to advert to the similarity which exists between the lochial and the catamenial flow of the human female. I have accumulated in my researches on the Cause of Labour the proofs which show, to my mind, that the time of parturition is a true catamenial period, and that the lochial discharge is the catamenial discharge modified by the act of parturition. In some persons, the catamenial flow appears during lactation, and in all, the ovarian periodicity is more or less evident; and as it is also present in a latent form throughout gestation, we may say that the ovarian or catamenial periodicity continues unbroken in healthy women from the date of the first catamenia at puberty, to their final cessation at the catamenial climacteric.

In cases of prolonged puerperal mania, accompanied by suppression of the lochia and catamenia, it is of considerable importance to attend to the ovarian periods following parturition. In these distressing cases, whenever the ovarian nisus comes round without being attended by the uterine secretion, there is generally a furious exacerbation of the malady. The treatment of these periods is often the most important part of the treatment of the whole disease.

III. MAMMARY PERIODICITIES.

The breasts are distinctly affected by the ovarian periodicity. In the unimpregnated states, the mammæ enlarge and become sensitive at each catamenial period. During pregnancy, the signs of the ovarian periods extend to the breasts. At the time of parturition, it is evidently the condition of the uterine system, including the ovaria, which excites the mammæ to the secretion of milk for the infant. This is the most powerful of all the synergic actions between the uterine system and the breasts. There is an evident diversion of the circulation from the uterus to the mammary glands, under the guidance of the nervous system, after delivery is completed. When the catamenia occur during lactation, the breasts are affected at each period, becoming tumid and painful, as in pregnancy. As the catamenial discharge ceases at each period, the secretion of milk is considerably increased. Many mothers, who have quite lost the sensation of "the draught" on ordinary occasions, observe it again at these times; and among women themselves there is a popular belief that the milk is renewed at the periods. There can, however, be no doubt that the co-existence of two such important discharges as the secretion of milk and the secretion of the catamenia, both of which are excretions, so far as the mother is concerned, must be highly exhausting and injurious to the constitution. When the catamenia are absent during lactation, there are still obscure signs of periodic disturbance of the mammæ, corresponding to the catamenial

dates, so that the periodicity is rarely, if ever, entirely suspended. In strictly healthy cases, on the conclusion of lactation, the catamenia appear at a regular ovarian date, so that, in this point of view, lactation is a multiple of the catamenial period. All the periodic mammary phenomena are, however, merely radiations or reflexions of the ovarian periodicities. The central periodic force is manifested in the ovaria, both the uterus and mammae being affected secondarily.

I have mentioned that some persons of excitable constitution have the catamenial flow while suckling. It is precisely in these subjects that pregnancy is most likely to happen. If, under such circumstances, suckling be persevered in, there is a great probability of premature loss of the ovum. There is here a stronger tendency than usual to periodic ovarian excitement, as proved by the fact of the catamenia recurring during lactation; and at each periodic stimulus there is the excitement of the breasts by suckling, these organs being now in more intimate reflex relation with the uterus than at any other time: thus the danger of abortion is considerably increased. When the catamenia accompany lactation, it ought always to be a question whether suckling should not be forbidden, but there can be no question that it should cease whenever the symptoms of pregnancy appear.

There is a well-recognised form of mania caused by the triple exhaustion of pregnancy, labour, and prolonged lactation. Women who have the catamenia habitually while suckling, are more liable than others to this form of disease, and when actual mania is avoided,

the cerebral excitement is often very great indeed at each returning catamenial period. There are all the effects of exhaustion combined with the excessive irritability produced by the ovarian disturbance.

IV. REAPPEARANCE OF THE CATAMENIA.

After delivery, the lochia continue to flow for a longer time than the true catamenia, changing gradually after a few days, from a sanguineous to a greenish colour. The differences between the catamenia and the lochia are probably attributable to the abraded surface from which the placenta has been separated, and to contusions or other injuries of the utero-vaginal canal. At the end of a lunar month from the date of parturition, the true catamenial secretion returns, unless it be suspended by lactation, ill health, or the effects of a severe labour; or unless induced prematurely by emotion, exertion, or some other cause. This regular return of the catamenia is often seen in women who do not suckle their children, or whose children are still-born, or who have the catamenia regularly during lactation. Many cases of course occur, in which there is irregularity in the return of the catamenia, but my observations convince me that the *tendency* to periodicity under these circumstances is very strong, and that the return of the catamenia twenty-eight days after parturition is the normal rule in cases where the health is good, and where lactation is either suspended, or does not interfere with the catamenial functions. In many

cases, the catamenia appear regularly at the end of a lunar month, after abortions, miscarriages, and premature labours.

V. CONCLUSION.

A correct nomenclature and the precise employment of certain terms are points of great importance in obstetric records.

The word "months" ought to be entirely banished from them, unless it be distinctly stated whether ovarian or lunar months are meant thereby. As the lunar and catamenial months correspond in duration, and as the catamenial periodicity is the basis of the periodicities of the sex, all their computations should be made in lunar or catamenial periods. Any statistics, whether based on individual observation, or on the records of a large number of practitioners, must be valueless, unless this condition be premised. In the same way, the term, "the last catamenia," should never be used without distinctly stating whether it be meant that the catamenia appeared or disappeared on a certain day; and any one dating from the day of the disappearance of the catamenia, should state the number of days during which the catamenial flow continued. It would be better in all cases to date from the day of the appearance of the catamenia, because the date of their return is much more regular than the date of their disappearance; in some women the flow continues for seven or eight days; and other cases are met with where the catamenia never continue more than a day or two.

I suppose that whatever amount of belief may be given to the views promulgated in the present Essay, the periodicities of the female sex will be more closely examined, and receive greater attention than heretofore. The Periodoscope offers a basis for a new scheme of observation, which cannot fail to settle many interesting but now doubtful points in sexual physiology and pathology. Periodicity is engraven indelibly upon the female organization, and its study cannot safely be neglected by the physician, if we consider that it modifies, and controls, the causes of disease, and the effects of remedies, during the most important part of the life of woman. I believe I have but given an outward tangible shape, to laws which actually exist within the female economy. These periodicities of the sex are in fact as important in the life of woman, as is the Gregorian calendar to mankind in general. The PERIODOSCOPE will not be without its use, if it should only make practitioners observe the duration of pregnancy in a definite manner, and upon intelligible data; but I also hope it will induce a greater watchfulness respecting the important periodicities of pregnancy itself, and their relation to the safety of both mother and fœtus; and also respecting the whole range of periodicity, and its relation to health and disease, both in the gravid and ungravid states.

Another benefit accruing from a precise and definite view of the female periodicities would be, that our attention could then be fastened more directly upon the intrinsic cause of periodicity itself. I cannot here enter upon the discussion of the reasons why the catamenia should

follow regularly at their due interval, or why pregnancy and lactation should be multiples of the catamenial period; but I believe I have some facts which furnish a clue to the comprehension of this mysterious part of the subject of generation. I believe all the periodicities of the sex, including the catamenia, pregnancy, and lactation, depend upon the constant and mutual action and re-action going on between the ovaria, the mammæ and the uterus; and that they are simply a record of the times occupied in the natural and physiological progress of these phenomena of action and reaction.

There are certain qualifications of the foregoing observations respecting the periodicities, which must naturally suggest themselves to the reader, but which I wish to express. The periodicity of the catamenia, of the chief events of pregnancy, and of the accession of labour is clearly marked: of this there can be no reasonable doubt. At the same time, many variations and inconstancies, some of them slight, others of an apparently glaring character, do really occur. It is not, therefore, meant to be asserted in these pages, that the ovarian periodicity points to events in the animal economy as unerringly as the magnet to the pole; or that the periodic times of the nervous system are as exact as the periodic times of the planets; though even the magnetic needle has its variations, and planets have their perturbations: but it is meant, that the periodicities of sex are so regular and powerful, that in many cases they become exact and decisive in their results, and that in all there is the distinct tendency, the strong determination, towards particular dates. Notwithstanding the admitted aberrations, it is

scarcely too much to say, that in many respects the periodoscopic indications of the uterine system will yield the physician practical information, as valuable in relation to affections of the uterus and ovaria, as the stethoscopic signs of the chest, in relation to affections of the heart and lungs.

